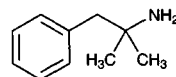


amine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfaethidole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleminamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

REFERENCE

Hill,D.W.; Kind,A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J.Anal.Toxicol.*, **1994**, *18*, 233–242.

Phentermine



Molecular formula: C₁₀H₁₅N

Molecular weight: 149.24

CAS Registry No.: 122-09-8, 1197-21-3 (HCl)

Merck Index: 7415

Lednicer No.: 1 72

SAMPLE

Matrix: bulk

Sample preparation: Mix a 1 mg/mL solution in 1 M sodium carbonate with 2 mL 5 mg/mL 8-quinolinesulfonyl chloride in acetone, heat at 65° for 20 min, cool, extract twice with 30 mL portions of chloroform. Combine the extracts and dry them over anhydrous magnesium sulfate, evaporate to dryness under a stream of air, reconstitute, inject an aliquot.

HPLC VARIABLES

Guard column: 70 × 2.1 Co:Pell ODS

Column: 300 × 3.9 μBondapak C18

Mobile phase: MeCN:water:acetic acid 40:59:1

Flow rate: 1.5

Detector: UV 254, UV 280

CHROMATOGRAM

Retention time: 30

OTHER SUBSTANCES

Simultaneous: amphetamine, ephedrine, methamphetamine, phenmetrazine, phenylpropanolamine, pseudoephedrine

KEY WORDS

derivatization

REFERENCE

Noggle,F.T.,Jr.; Clark,C.R. Liquid chromatographic determination of primary and secondary amines as 8-quinolinesulfonyl chloride derivatives, *J.Assoc.Off.Anal.Chem.*, **1984**, *67*, 687–691.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a solution in mobile phase, inject 75-100 μL aliquot.

HPLC VARIABLES

Column: 250 × 4.6 5 μm Supelco

Mobile phase: EtOH:MeCN:t-butylamine 98:2:0.05 (Prepared from 1 gal EtOH + 77 mL MeCN + 1.9 mL t-butylamine.)

Flow rate: 2

Injection volume: 75-100

Detector: UV 254

CHROMATOGRAM

Retention time: 2.9

Internal standard: promazine (5.2)

OTHER SUBSTANCES

Simultaneous: N-acetylprocainamide, amoxapine, amphetamine, buprion, chlordiazepoxide, chlorpheniramine, chlorpromazine, cocaine, codeine, demoxepam, desipramine, desmethyl-chlordiazepoxide, desmethyldisopyramide, desmethyldoxepin, dextropropoxyphene, diazepam, disopyramide, doxepin, hydroxyamoxapine (7- and 8-), 2-hydroxydesipramine, 2-hydroxyimipramine, 10-hydroxynortriptyline, iminostilbene, imipramine, iprindole, maprotiline, meperidine, mianserin, morphine, nortriptyline, norzimeldine, oxapam, oxaprotiline, procainamide, prochlorperazine, prolixin, promethazine, propoxyphene, protriptyline, pyrilamine, quinidine, thioridazine, trifluoperazine, trimeprazine, trimipramine, zimeldine

Noninterfering: thiopropazine

Interfering: amitriptyline, chlorimipramine, fluphenazine, loxepin, methadone, perphenazine, triflupromazine

KEY WORDS

normal phase

REFERENCE

Beierle, F.A.; Hubbard, R.W. Liquid chromatographic separation of antidepressant drugs: I. Tricyclics, *Ther. Drug Monit.*, **1983**, *5*, 279-292.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH at a concentration of 1 mg/mL, inject a 20 μ L aliquot.

HPLC VARIABLES

Column: 250 \times 5 Spherisorb S5W

Mobile phase: MeOH:buffer 90:10 (Buffer was 94 mL 35% ammonia and 21.5 mL 70% nitric acid in 884 mL water, adjust the pH to 10.1 with ammonia.)

Flow rate: 2

Injection volume: 20

Detector: UV 254

CHROMATOGRAM

Retention time: 2.45

OTHER SUBSTANCES

Simultaneous: norlevorphanol, methadone, benzylmorphine, ethylmorphine, morphine-N-oxide, codeine, codeine-N-oxide, morphine, ethoheptazine, morphine-3-glucuronide, pholcodeine, norpethidine, hydrocodone, dihydrocodeine, dihydromorphine, levorphanol, norcodeine, normorphine, pemoline, benzphetamine, diethylpropion, mazindol, tranlycypromine, caffeine, fenethyline, phendimetrazine, methylphenidate, phenelzine, epinephrine, pipradol, normetanephrine, 4-hydroxyamphetamine, bromo-STP, STP, prolintane, 2-phenethylamine, tyramine, trimethoxyamphetamine, phenylephrine, pseudoephedrine, ephedrine, methylephedrine, dimethylamphetamine, methamphetamine, mescaline, mephentermine, buprenorphine, dextromoramide, phenoperidine, fentanyl, etorphine, piritramide, noscapine, papaverine, naloxone, dextropropoxyphene, nalorphine, phenazocine, norpipanone, levallorphan, hydroxypethidine, normethadone, meperidine, dipipanone, diamorphine, pentazocine

Noninterfering: dopamine, levodopa, methyl dopa, methyl dopate, norepinephrine

Interfering: phenylpropanolamine, fencamfamin, chlorphentermine, norpseudoephedrine, fenfluramine, methylenedioxamphetamine, amphetamine, acetylcodeine, monoacetylmorphine, thebacon, oxycodone, thebaine

REFERENCE

Law,B.; Gill,R.; Moffat,A.C. High-performance liquid chromatography retention data for 84 basic drugs of forensic interest on a silica column using an aqueous methanol eluent, *J.Chromatogr.*, **1984**, 301, 165–172.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH:water 1:1 at a concentration of 50 µg/mL, inject a 10 µL aliquot.

HPLC VARIABLES

Column: 300 × 3.9 10 µm µBondapak C18

Mobile phase: MeOH:acetic acid:triethylamine:water 15:1.5:0.5:83

Flow rate: 1.5

Injection volume: 10

Detector: UV 254

CHROMATOGRAM

Retention time: 19

OTHER SUBSTANCES

Simultaneous: phenylpropanolamine, ephedrine, hydroxyamphetamine, amphetamine, methamphetamine, mephentermine

REFERENCE

Roos,R.W.; Lau-Cam,C.A. General reversed-phase high-performance liquid chromatographic method for the separation of drugs using triethylamine as a competing base, *J.Chromatogr.*, **1986**, 370, 403–418.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a 0.5 mg/mL solution in water, inject a 5 µL aliquot.

HPLC VARIABLES

Column: 250 × 4.6 Zorbax RX

Mobile phase: Gradient. A was 150 mM phosphoric acid and 50 mM triethylamine. B was MeCN: water 80:20 containing 150 mM phosphoric acid and 50 mM triethylamine. A:B 100:0 for 2.2 min then to 0:100 over 30 min.

Column temperature: 30

Flow rate: 2

Injection volume: 5

Detector: UV 210

CHROMATOGRAM

Retention time: 9.3

OTHER SUBSTANCES

Simultaneous: acetaminophen, aprobarbital, butabarbital, chlordiazepoxide, chloroxylenol, chlorpromazine, clenbuterol, cortisone, danazol, diflunisal, doxapram, estrone, fluoxymesterone, mefenamic acid, methyltestosterone, nicotine, oxazepam, phenylpropanolamine, progesterone, sulfamethazine, sulfanilamide, testosterone, testosterone propionate, tranlycypromine, tripeleennamine

Interfering: β-hydroxyethyltheophylline

KEY WORDS

details for purification of triethylamine in paper

REFERENCE

Hill,D.W.; Kind,A.J. The effects of type B silica and triethylamine on the retention of drugs in silica based reverse phase high performance chromatography, *J.Liq.Chromatogr.*, **1993**, 16, 3941–3964.

SAMPLE

Matrix: solutions

HPLC VARIABLES**Guard column:** 30 × 2.1 Spheri-5 RP-8**Column:** 220 × 2.1 Spheri-5 RP-8**Mobile phase:** Gradient. A was 0.08% diethylamine and 0.09% phosphoric acid in water, pH 2.3. B was MeCN:water 90:10 containing 0.08% diethylamine and 0.09% phosphoric acid. A:B 95:5 for 2 min, to 0:100 over 15 min (?), maintain at 0:100 for 5 min.**Column temperature:** 50**Flow rate:** 0.5**Detector:** UV 200

CHROMATOGRAM**Retention time:** 7.5

OTHER SUBSTANCES**Simultaneous:** diethylpropion, phenylpropanolamine, ephedrine, amphetamine, methamphetamine, fenfluramine**Also analyzed:** amitriptyline, chlordiazepoxide, chlorpromazine, desalkylflurazepam, desipramine, desmethyldoxepin, diazepam, doxepin, flurazepam, imipramine, mesoridazine, norchlordiazepoxide, nordiazepam, nortriptyline, oxazepam, prazepam, promazine, thioridazine, thiothixene, trifluoperazine

REFERENCE*Rainin Catalog, C1-94, 1994, p. 7.24.*

SAMPLE**Matrix:** solutions

HPLC VARIABLES**Column:** 250 × 4.6 Zorbax RX**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.**Column temperature:** 30**Flow rate:** 2**Detector:** UV 210

OTHER SUBSTANCES**Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitriptyline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlordiazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fencamfamine, fenpropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiacol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxystyryl, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclufenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, meperidine, mephentermine, mephénytoin, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, meth-

yltestosterone, methypyrlyon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nylidrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phencyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyrrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfaethidole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleonnamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

REFERENCE

Hill, D.W.; Kind, A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J. Anal. Toxicol.*, **1994**, *18*, 233–242.

SAMPLE

Matrix: urine

Sample preparation: 500 μ L Urine + chlorpheniramine + 100 μ L buffer, centrifuge at 11000 g for 30 s, inject a 500 μ L aliquot onto column A with mobile phase A, after 0.6 min backflush column A with mobile phase A to waste for 1.6 min, elute column A with 250 μ L mobile phase B, with 200 μ L mobile phase C, and with 1.15 mL mobile phase D. Elute column A to waste until drugs start to emerge then elute onto column B. Elute column B to waste until drugs started to emerge, then elute onto column C. When all the drugs have emerged from column B remove it from the circuit, elute column C with mobile phase D, monitor the effluent from column C. Flush column A with 7 mL mobile phase E, with mobile phase D, and mobile phase A. Flush column B with 5 mL mobile phase E then with mobile phase D. (Buffer was 6 M ammonium acetate adjusted to pH 8.0 with 2 M KOH.)

HPLC VARIABLES

Column: A 10 \times 2.1 12–20 μ m PRP-1 spherical poly(styrene-divinylbenzene) (Hamilton); B 10 \times 3.2 11 μ m Aminex A-28 (Bio-Rad); C 25 \times 3.2 5 μ m C8 (Phenomenex) + 150 \times 4.6 5 μ m silica (Macherey-Nagel)

Mobile phase: A 0.1% pH 8.0 potassium borate buffer; B 6 mM KH_2PO_4 containing 5 mM tetramethylammonium hydroxide, and 2 mM dimethyloctylamine, pH adjusted to 6.50 with phosphoric acid; C MeCN:buffer 40:60 (Buffer was 6 mM KH_2PO_4 containing 5 mM tetramethylammonium hydroxide, and 2 mM dimethyloctylamine, pH adjusted to 6.50 with phosphoric acid.); D MeCN:buffer 33:67 (Buffer was 6 mM KH_2PO_4 containing 5 mM tetramethylammonium hydroxide, and 2 mM dimethyloctylamine, pH adjusted to 6.50 with phosphoric acid.); E MeCN:buffer 70:30 (Buffer was 6 mM KH_2PO_4 containing 5 mM tetramethylammonium hydroxide, and 2 mM dimethyloctylamine, pH adjusted to 6.50 with phosphoric acid.)

Column temperature: ambient (column A), 40 (columns B and C)

Flow rate: A 5; B–E 1

Injection volume: 500

Detector: UV 210, UV 235

CHROMATOGRAM

Retention time: k' 2.4

Internal standard: chlorpheniramine (k' 5.9)

Limit of detection: 300 ng/mL

OTHER SUBSTANCES

Extracted: pentazocine, methamphetamine, desipramine, nortriptyline, diphenhydramine, methadone, imipramine, flurazepam, amitriptyline, morphine, codeine, hydromorphone, hydrocodone, caffeine, cotinine, benzoylecgonine, secobarbital, oxazepam, phenobarbital, nordiazepam, diazepam

Interfering: phenylpropanolamine, amphetamine, phenmetrazine, lidocaine, ephedrine

KEY WORDS

column-switching

REFERENCE

Binder, S.R.; Regalia, M.; Biaggi-McEachern, M.; Mazhar, M. Automated liquid chromatographic analysis of drugs in urine by on-line sample cleanup and isocratic multi-column separation, *J. Chromatogr.*, **1989**, 473, 325–341.

SAMPLE

Matrix: urine

Sample preparation: Condition a 100 mg Adsorbex SCX cation-exchange SPE cartridge (Merck) with 2 mL MeOH, 1 mL water, and 1 mL 17 mM KH_2PO_4 , do not allow to dry. Centrifuge urine at 2000 g for 5 min. 1 mL Urine + 500 μL 50 mM KH_2PO_4 , sonicate for 1 min, add to the SPE cartridge, rinse vial with 50 μL 50 mM KH_2PO_4 , and add to cartridge, dry cartridge for 1 min, wash with three 500 μL portions of 17 mM KH_2PO_4 , wash with 1 mL MeOH, dry under vacuum for 1 min, elute with four 500 μL portions of MeOH:7.3% HCl (97.5:2.5) at a flow rate of 0.5 mL/min, inject a 10 μL aliquot.

HPLC VARIABLES

Column: 125 \times 4 3 μm Spherisorb ODS-1

Mobile phase: Gradient. A was water containing 5 mL (8.5 g) 85% orthophosphoric acid and 280 μL (0.22 g) hexylamine per liter. B was MeCN containing 100 mL water, 5 mL (8.5 g) 85% orthophosphoric acid, and 280 μL (0.22 g) hexylamine per liter. A:B 94.5:5.5 for 10.6 min, then to 61:39 over 11 min.

Column temperature: 40

Flow rate: 0.8

Injection volume: 10

Detector: UV 198

CHROMATOGRAM

Retention time: 10

Limit of detection: 30 ng/mL

OTHER SUBSTANCES

Extracted: 3,4-methylenedioxyamphetamine, amphetamine, 4-methoxyamphetamine, methamphetamine, 3,4-methylenedioxymethamphetamine, 5-methoxy-3,4-methylenedioxyamphetamine, 3,4,5-trimethoxyamphetamine, 3,4-methylenedioxyethylamphetamine, 2,5-dimethoxyamphetamine, 4-bromo-2,5-dimethoxyphenylethylamine, 2,5-dimethoxy-4-methylamphetamine, 4-bromo-2,5-dimethoxyamphetamine, 2,5-dimethoxy-4-ethylamphetamine, mescaline, methoxamine

KEY WORDS

SPE

REFERENCE

Helmlin, H.-J.; Brenneisen, R. Determination of psychotropic phenylalkylamine derivatives in biological matrices by high-performance liquid chromatography with photodiode-array detection, *J. Chromatogr.*, **1992**, 593, 87–94.

Phentolamine

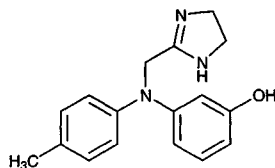
Molecular formula: C₁₇H₁₉N₃O

Molecular weight: 281.36

CAS Registry No.: 50-60-2, 73-05-2 (HCl), 65-28-1 (mesylate)

Merck Index: 7417

Lednicer No.: 1 242



SAMPLE

Matrix: blood, tissue

Sample preparation: Serum. 200-450 μ L Serum + 20 μ L 50-100 μ g/mL yohimbine in water + 800 μ L 1 M pH 9.2 Delory King carbonate buffer, vortex, add 5 mL diethyl ether, mix for 30 s, centrifuge at 1000 g for 2 min. Remove the organic phase and add it to 100 μ L 100 mM HCl, mix for 30 s, centrifuge at 1000 g for 2 min, discard the ether, volatilize residual ether from the aqueous phase under a stream of nitrogen, inject a 10-70 μ L of the aqueous phase. Liver. Homogenize 1 g of liver in 3 mL ice cold 1 M pH 9.2 Delory King carbonate buffer, add 2 g yohimbine, add 5 mL diethyl ether, mix for 30 s, centrifuge at 1000 g for 2 min. Remove the organic phase and add it to 100 μ L 100 mM HCl, mix for 30 s, centrifuge at 1000 g for 2 min, discard the ether, volatilize residual ether from the aqueous phase under a stream of nitrogen, inject a 10-70 μ L of the aqueous phase.

HPLC VARIABLES

Column: 100 \times 3.2 3 μ m Phase-2 ODS

Mobile phase: MeCN:15 mM pH 3.0 monochloroacetate buffer 25:75 containing 350 mg/L EDTA

Flow rate: 0.6

Injection volume: 10-70

Detector: E, Bioanalytical Systems LC-4B, LC-17 oxidative flow cell, TL-5 glassy carbon electrode + 900 mV, Ag/AgCl reference electrode

CHROMATOGRAM

Retention time: 4.75

Internal standard: yohimbine (3.0)

Limit of detection: 10 ng/mL (liver homogenate), 5 ng/mL (serum)

KEY WORDS

serum; liver; mouse; pharmacokinetics

REFERENCE

Kerger,B.D.; James,R.C.; Roberts,S.M. An assay for phentolamine using high performance liquid chromatography with electrochemical detection, *Anal.Biochem.*, **1988**, *170*, 145-151.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a 10 μ g/mL solution in MeOH, inject a 20 μ L aliquot.

HPLC VARIABLES

Column: 125 \times 4.9 Spherisorb S5W silica

Mobile phase: MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7

Flow rate: 2

Injection volume: 20

Detector: E, LeCarbone, V25 glassy carbon electrode, + 1.2 V

CHROMATOGRAM

Retention time: 2.5

OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzocetamine, benzphetamine, benzquin-

amide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotenine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorprenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cyclizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazepine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipipanone, diprenorphine, dipyrizidine, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, fluopromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserin, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamlamine, meclorphenoxate, meclozine, medazepam, mephentermine, mepivacaine, meptazinol, mepyramine, mesoridazine, metaraminol, methadone, methamphetamine, methapyrilene, methidiazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypropazine, methylephedrine, methylergonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nomifensine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, pecazine, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenglutarimide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxybenzamine, phenylephrine, phenyltoloxamine, physostigmine, pimindone, pimizole, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, properidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenyldiamine, theophylline, thiethylperazine, thiopropazate, thioproperazine, thioridazine, thiothixene, thonzylamine, timolol, tocainide, tolpropamine, tolycaine, tranlycypromine, trazodone, trifluoperazine, trifluoperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripeleminamine, triprolidine, tryptamine, verapamil, xylometazoline

REFERENCE

Jane, I.; McKinnon, A.; Flanagan, R. J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J. Chromatogr.*, **1985**, *323*, 191–225.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH:water 1:1 at a concentration of 50 µg/mL, inject a 10 µL aliquot.

HPLC VARIABLES

Column: 300 × 3.9 10 µm µBondapak C18

Mobile phase: MeOH:acetic acid:triethylamine:water 40:1.5:0.5:58

Flow rate: 1.5

Injection volume: 10

Detector: UV

CHROMATOGRAM

Retention time: k' 2.41

REFERENCE

Roos, R. W.; Lau-Cam, C. A. General reversed-phase high-performance liquid chromatographic method for the separation of drugs using triethylamine as a competing base, *J. Chromatogr.*, **1986**, *370*, 403–418.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 150 × 3.9 5 µm Nova Pak C18

Mobile phase: MeCN:50 mM pH 5.5 phosphate buffer 25:75

Flow rate: 1.5

Detector: UV 254

CHROMATOGRAM

Retention time: 4.3

Internal standard: papaverine (8.9)

OTHER SUBSTANCES

Simultaneous: degradation products

KEY WORDS

stability-indicating; buffer

REFERENCE

Wang,D.-P.; Tu,Y.-H.; Allen,L.V.,Jr. Degradation kinetics of phentolamine hydrochloride in solution, *J.Pharm.Sci.*, **1988**, 77, 972-976.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 150 × 4.6 12 μm 1-myristoyl-2-[(13-carboxyl)-tridecyl]-sn-3-glycerophosphocholine chemically bonded to silica (Regis)

Mobile phase: MeCN:100 mM pH 7.0 phosphate buffer 20:80

Flow rate: 1

Detector: UV 254

CHROMATOGRAM

Retention time: k' 21.88

OTHER SUBSTANCES

Also analyzed: acebutolol, alprenolol, antazoline, atenolol, betaxolol, bisoprolol, bopindolol, bupranolol, carteolol, celiprolol, chloropyramine, chlorpheniramine, cicloprolol, cimetidine, cinarizine, cirazoline, clonidine, dilevalol, dimethindene, diphenhydramine, doxazosin, esmolol, famotidine, isothipendyl, ketotifen, metiamide, metoprolol, moxonidine, nadolol, naphazoline, nifenalol, nizatidine, oxprenolol, pheniramine, pindolol, pizotyline (pizotifen), practolol, prazosin, promethazine, propranolol, pyrilamine (mepyramine), ranitidine, roxatidine, sotalol, tiamenidine, timolol, tramazoline, tripeleennamine, triprolidine, tymazoline, UK-14,304

REFERENCE

Kaliszan,R.; Nasal,A.; Turowski,M. Binding site for basic drugs on α₁-acid glycoprotein as revealed by chemometric analysis of biochromatographic data, *Biomed.Chromatogr.*, **1995**, 9, 211-215.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 250 × 4.6 5 μm Supelcosil LC-DP (A) or 250 × 4 5 μm LiChrospher 100 RP-8 (B)

Mobile phase: MeCN:0.025% phosphoric acid:buffer 25:10:5 (A) or 60:25:15 (B) (Buffer was 9 mL concentrated phosphoric acid and 10 mL triethylamine in 900 mL water, adjust pH to 3.4 with dilute phosphoric acid, make up to 1 L.)

Flow rate: 0.6

Injection volume: 25

Detector: UV 229

CHROMATOGRAM

Retention time: 9.05 (A), 4.79 (B)

OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetaminophen, acetazolamide, acetophenazine, albuterol, alprazolam, amitriptyline, amobarbital, amoxapine, antipyrine, atenolol, atropine, azatadine, baclofen, benzocaine, bromocriptine, brompheniramine, brotizolam, bupivacaine, buspirone, butabarbital, butalbital, caffeine, carbamazepine, cetirizine, chlorcyclizine, chlordi-azepoxide, chlormezanone, chloroquine, chlorpheniramine, chlorpromazine, chlorpropamide, chlorprothixene, chlorthalidone, chlorzoxazone, cimetidine, cisapride, clomipramine, clonazepam, clonidine, clozapine, cocaine, codeine, colchicine, cyclizine, cyclobenzaprine, dantrolene, desipramine, diazepam, diclofenac, diflunisal, diltiazem, diphenhydramine, diphenidol, diphenoxylate, dipyrindamole, disopyramide, dobutamine, doxapram, doxepin, droperidol, encainide, ethidium bromide, ethopropazine, fenoprofen, fentanyl, flavoxate, fluoxetine, fluphenazine, flurazepam, flurbiprofen, fluvoxamine, furosemide, glutethimide, glyburide, guaifenesin, haloperidol, homatropine, hydralazine, hydrochlorothiazide, hydrocodone, hydromorphone, hydroxychloroquine, hydroxyzine, ibuprofen, imipramine, indomethacin, ketoconazole, ketoprofen, ketorolac, labetalol, levorphanol, lidocaine, loratadine, lorazepam, lovastatin, loxapine, mazin-
dol, mefenamic acid, meperidine, mephénytoin, mepivacaine, mesoridazine, metaproterenol, metformin, methadone, methdilazine, methocarbamol, methotrexate, methotrimeprazine, methoxamine, methyl dopa, methylphenidate, metoclopramide, metolazone, metoprolol, metronidazole, midazolam, moclobemide, morphine, nadolol, nalbuphine, naloxone, naphazoline, naproxen, nifedipine, nizatidine, norepinephrine, nortriptyline, oxazepam, oxycodone, oxymet-azoline, paroxetine, pemoline, pentazocine, pentobarbital, pentoxifylline, perphenazine, phen-iramine, phenobarbital, phenol, phenolphthalein, phenylbutazone, phenyltoloxamine, phenyt-
oin, pimozide, pindolol, piroxicam, pramoxine, prazepam, prazosin, probenecid, procainamide, procaine, prochlorperazine, procyclidine, promazine, promethazine, propafenone, propanthe-
line, propiomazine, propofol, propranolol, protriptyline, quazepam, quinidine, quinine, race-methorphan, ranitidine, remoxipride, risperidone, salicylic acid, scopolamine, secobarbital, ser-
traline, sotalol, spironolactone, sulfapyrazone, sulindac, temazepam, terbutaline, terfenadine, tetracaine, theophylline, thiethylperazine, thiopental, thioridazine, thiothixene, timolol, tocin-
ide, tolbutamide, tolmetin, trazodone, triamterene, triazolam, trifluoperazine, triflupromazine, trimeprazine, trimethoprim, trimipramine, verapamil, warfarin, xylometazoline, yohimbine, zopicleone

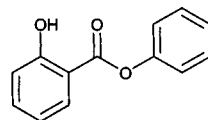
KEY WORDS

details of plasma extraction

REFERENCE

Koves, E.M. Use of high-performance liquid chromatography-diode array detection in forensic toxicology, *J. Chromatogr. A*, **1995**, 692, 103–119.

Phenyl salicylate



Molecular formula: $C_{13}H_{10}O_3$

Molecular weight: 214.22

CAS Registry No.: 118-55-8

Merck Index: 7464

SAMPLE

Matrix: solutions

Sample preparation: Prepare a solution in mobile phase, inject an aliquot.

HPLC VARIABLES

Guard column: 40 × 5 RP-18-MPLC (Brownlee)

Column: 250 × 2.6 ODS-HC-SIL-X (Perkin-Elmer)

Mobile phase: MeOH:50 mM phosphoric acid 70:30 (Flush column with MeOH at the end of each day.)

Column temperature: 40

Flow rate: 1

Injection volume: 20

Detector: UV 256

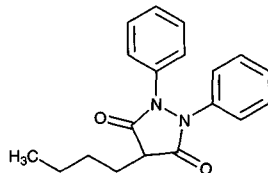
CHROMATOGRAM**Retention time:** 5.25

OTHER SUBSTANCES**Simultaneous:** hydrocortisone, iodochlorhydroxyquin

REFERENCE

Ezzedeen, F.W.; Stohs, S.J.; Masoud, A.N. High-performance liquid chromatographic analysis of iodochlorhydroxyquin and hydrocortisone in ointments and creams, *J.Pharm.Sci.*, **1983**, 72, 1036–1039.

Phenylbutazone

Molecular formula: $C_{19}H_{20}N_2O_2$ **Molecular weight:** 308.38**CAS Registry No.:** 50-33-9**Merck Index:** 7431**Lednicer No.:** 1 236

SAMPLE**Matrix:** blood**Sample preparation:** Filter serum and inject a 20 μ L aliquot of the filtrate.

HPLC VARIABLES**Guard column:** present but not defined**Column:** 150 \times 4.6 SPS-5PM-S5-100-C18 semipermeable surface column (Regis Chemical, IL) (A two phase column with an outer hydrophilic polyoxyethylene polymer bonded to the silica surface and an inner hydrophobic C18 phase, see *J.Chromatogr.* 1991, 544, 13-23.)**Mobile phase:** MeCN:50 mM pH 7.5 phosphate buffer 15:85**Flow rate:** 1**Injection volume:** 20**Detector:** UV 265

CHROMATOGRAM**Retention time:** 11.3

OTHER SUBSTANCES**Extracted:** metabolites

KEY WORDSserum

REFERENCE

Haque, A.; Stewart, J.T. Direct injection HPLC method for the determination of phenylbutazone and oxyphenylbutazone in serum using a semipermeable surface column, *J.Pharm.Biomed.Anal.*, **1997**, 16, 287–293.

SAMPLE**Matrix:** blood**Sample preparation:** Filter serum and inject a 20 μ L aliquot of the filtrate.

HPLC VARIABLES**Guard column:** present but not defined**Column:** 150 \times 4.6 GFF-S5-80 ISRP high efficiency column (A two phase column with an outer hydrophilic diol-glycine layer bonded to the silica surface and an inner hydrophobic diol-tripeptide phase, see *J.Chromatogr.* 1991, 544, 13-23.)**Mobile phase:** MeCN:200 mM pH 7.0 phosphate buffer 2.5:97.5**Flow rate:** 1

Injection volume: 20

Detector: UV 265

CHROMATOGRAM

Retention time: 10.5

OTHER SUBSTANCES

Extracted: metabolites

KEY WORDS

serum

REFERENCE

Haque,A.; Stewart,J.T. Direct injection HPLC method for the determination of phenylbutazone and oxyphenylbutazone in serum using a semipermeable surface column, *J.Pharm.Biomed.Anal.*, **1997**, 16, 287–293.

SAMPLE

Matrix: blood

Sample preparation: 1 mL Plasma or serum + 4 mL 250 ng/mL naproxen in MeCN, vortex for 30 s, centrifuge at 1000 g for 15 min. Remove 4 mL of the supernatant and evaporate it to dryness under a stream of nitrogen at 37°, reconstitute the residue in 500 µL mobile phase, inject a 50 µL aliquot.

HPLC VARIABLES

Guard column: 50 mm long 30 µm pellicular ODS

Column: 250 mm long 5 µm Spherisorb ODS I

Mobile phase: MeCN:MeOH:1% pH 3.0 acetate buffer 30:20:50

Flow rate: 1.2

Injection volume: 50

Detector: UV 254

CHROMATOGRAM

Retention time: 14.2

Internal standard: naproxen (7.7)

Limit of detection: 50 ng/mL

OTHER SUBSTANCES

Extracted: flunixin, oxyphenbutazone

KEY WORDS

plasma; serum; horse; pharmacokinetics; for dogs (see *Am.J.Vet.Res.* 1985; 46; 235)

REFERENCE

Hardee,G.E.; Lai,J.-W.; Moore,J.N. Simultaneous determination of flunixin, phenylbutazone, oxyphenbutazone and γ-hydroxyphenylbutazone in equine plasma by high-performance liquid chromatography: With application to pharmacokinetics, *J.Liq.Chromatogr.*, **1982**, 5, 1991–2003.

SAMPLE

Matrix: blood

Sample preparation: Condition a Bond Elut phenyl SPE cartridge with 5 mL MeOH and 5 mL water. 500 µL Plasma + 50 µL 40 µg/mL indomethacin in MeOH, adjust to pH 3.4 with 345 mM citrate buffer, add to SPE cartridge, wash with water, dry, elute with 5 mL hexane:diethyl ether 50:50. Evaporate the eluate to dryness under a stream of nitrogen at 40°, reconstitute the residue in 200 µL MeOH, inject a 25 µL aliquot.

HPLC VARIABLES

Guard column: 6 × 4 µm Nova-Pack C18

Column: 150 × 4.6 5 µm Ultrasphere ODS

Mobile phase: MeCN:20 mM ammonium sulfate 55:45

Flow rate: 1.5

Injection volume: 25

Detector: UV 340

CHROMATOGRAM

Retention time: 10

Internal standard: indomethacin (7.5)

Limit of quantitation: 50 ng/mL

OTHER SUBSTANCES

Extracted: oxyphenbutazone, suxibuzone

KEY WORDS

plasma; SPE

REFERENCE

Caturla, M.C.; Cusido, E. Solid-phase extraction for the high-performance liquid chromatographic determination of indomethacin, suxibuzone, phenylbutazone and oxyphenbutazone in plasma, avoiding degradation of compounds, *J. Chromatogr.*, **1992**, 581, 101–107.

SAMPLE

Matrix: blood

Sample preparation: 200 μ L Plasma + 200 μ L MeCN, vortex for a few s, centrifuge at 2500 g for 5 min. Remove 100 μ L of the supernatant and add it to 300 μ L water, inject a 50 μ L aliquot.

HPLC VARIABLES

Column: 33 \times 4.6 3 μ m Supelcosil LC-18

Mobile phase: EtOH containing 0.2% heptylamine:5 mM KH_2PO_4 30:70 (Place a 33 \times 4.7 column of 37–53 μ m pellicular ODS (Whatman) between pump and injector.)

Flow rate: 1.3

Injection volume: 50

Detector: UV 270

CHROMATOGRAM

Retention time: 6

Internal standard: phenylbutazone

OTHER SUBSTANCES

Extracted: propyphenazone

KEY WORDS

phenylbutazone is IS; plasma

REFERENCE

Rouan, M.C.; Campestrini, J.; Lecaillon, J.B.; Godbillon, J. Rapid determination of propyphenazone in plasma by high-performance liquid chromatography, *J. Chromatogr.*, **1992**, 577, 387–390.

SAMPLE

Matrix: blood

Sample preparation: 500 μ L Plasma + 1.5 mL MeOH, vortex, centrifuge for 15 min at 3000 g. Remove the supernatant and evaporate it to 500 μ L using a vortex evaporator, inject a 20 μ L aliquot.

HPLC VARIABLES

Guard column: present but not specified

Column: 10 μ m RP-8 (Alltech)

Mobile phase: MeOH:1% acetic acid 70:30

Injection volume: 20

Detector: UV 240

CHROMATOGRAM

Internal standard: phenylbutazone

OTHER SUBSTANCES

Extracted: naproxen, napdice

KEY WORDS

dog; plasma; phenylbutazone is IS

REFERENCE

Samara,E.; Avnir,D.; Ladkani,D.; Bialer,M. Pharmacokinetic analysis of diethylcarbonate prodrugs of ibuprofen and naproxen, *Biopharm.Drug Dispos.*, **1995**, 16, 201–210.

SAMPLE

Matrix: blood

Sample preparation: Condition a 500 mg 6 mL Isolute C18 non-encapped SPE cartridge (International Sorbent Technology) with 2 mL MeOH and 2 mL water. 2 mL Plasma + 100 μ L 100 μ g/mL fenclofenac in MeOH + 1 mL 100 mM pH 7.2 phosphate buffer + 3 mL water, mix, add to the SPE cartridge, wash with 1 mL 100 mM pH 7.2 phosphate buffer, wash with 2 mL hexane, dry under vacuum for 2 min, elute with hexane:ethyl acetate 50:50. Evaporate the eluate to dryness under a stream of nitrogen, reconstitute the residue in 100 μ L MeOH and 150 μ L 100 mM pH 7.2 phosphate buffer, inject a 50 μ L aliquot.

HPLC VARIABLES

Column: 100 \times 4.6 5 μ m Hypersil C18

Mobile phase: MeOH:buffer 60:40 (Buffer was 100 mM acetic acid containing 0.01% heptane-sulfonic acid.)

Column temperature: 40

Flow rate: 1.5

Injection volume: 50

Detector: UV 240

CHROMATOGRAM

Retention time: 5

Internal standard: fenclofenac (7.5)

Limit of quantitation: 1 μ g/mL

OTHER SUBSTANCES

Extracted: oxyphenbutazone

KEY WORDS

horse; plasma; SPE

REFERENCE

Taylor,M.R.; Westwood,S.A. Quantitation of phenylbutazone and oxyphenbutazone in equine plasma by high-performance liquid chromatography with solid-phase extraction, *J.Chromatogr.A*, **1995**, 697, 389–396.

SAMPLE

Matrix: blood

Sample preparation: 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol:n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100 μ L mobile phase, centrifuge at 2800 g for 5 min, inject a 50 μ L aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

HPLC VARIABLES

Column: 300 \times 3.9 4 μ m NovaPack C18

Mobile phase: MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic)) KH_2PO_4 adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)

Column temperature: 30

Flow rate: 0.8

Injection volume: 50

Detector: UV 239

CHROMATOGRAM

Retention time: 6.51

Limit of detection: <120 ng/mL

KEY WORDS

whole blood; plasma; interferences may occur—compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylcegonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; carteolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihydralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; triazolam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lorazepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temazepam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; alminoprofen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; acenocoumarol; vandesine; mexiletine; dipyridamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; flecainide; phencyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; buprenorphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazolam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; aceprometazine; glibenclamide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluoperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenopropfen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; methadone; amoxapine; quinupramine; opipramol; cyproheptadine; brompheniramine; mefenidramine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; fluvoxamine; pimozide; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tiocloamarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpipramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

REFERENCE

Tracqui, A.; Kintz, P.; Mangin, P. Systematic toxicological analysis using HPLC/DAD, *J. Forensic Sci.*, **1995**, *40*, 254–262.

SAMPLE

Matrix: blood, urine

Sample preparation: Plasma. 1 mL Plasma + 50 μ L 500 ng/mL mefenamic acid or indomethacin + 1 mL 100 mM HCl + 10 mL dichloromethane, rotate for 10 min, centrifuge at 1500 g for 15 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 45°. Redissolve the residue in mobile phase, inject a 20 μ L aliquot. Urine. 50 μ L Urine + 1 mL mobile phase, inject a 20 μ L aliquot.

HPLC VARIABLES

Column: 75 \times 4.6 3 μ m Supelcosil LC-8

Mobile phase: MeCN:50 mM phosphoric acid 45:55

Flow rate: 1

Injection volume: 20

Detector: UV 235

CHROMATOGRAM

Retention time: 4.0

Internal standard: mefenamic acid (8) or indomethacin (5)

Limit of detection: 50-250 ng/mL

OTHER SUBSTANCES

Simultaneous: naproxen, flunixin, thiosalicylic acid, ethacrynic acid

KEY WORDS

plasma

REFERENCE

Singh,A.K.; Jang,Y.; Mishra,U.; Granley,K. Simultaneous analysis of flunixin, naproxen, ethacrynic acid, indomethacin, phenylbutazone, mefenamic acid and thiosalicylic acid in plasma and urine by high-performance liquid chromatography and gas chromatography-mass spectrometry, *J.Chromatogr.*, **1991**, 568, 351-361.

SAMPLE

Matrix: blood, urine

Sample preparation: Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50 µL MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject a 10 (urine) or 30 (blood) µL aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

HPLC VARIABLES

Guard column: 20 mm long Symmetry C18

Column: 250 × 4.6 5 µm Symmetry C8 (Waters)

Mobile phase: Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.

Column temperature: 30

Flow rate: 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)

Injection volume: 10-30

Detector: UV 200.5

CHROMATOGRAM

Retention time: 24.098

KEY WORDS

whole blood

REFERENCE

Gaillard,Y.; Pépin,G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J.Chromatogr.A*, **1997**, 763, 149-163.

SAMPLE

Matrix: perfusate

Sample preparation: Inject an aliquot of perfusate. (Perfusion fluid contained 104 mM NaCl, 25 mM sodium bicarbonate, 2.3 mM sodium biphosphate, 10 mM sodium acetate, 1.2 mM calcium chloride, 1 mM magnesium sulfate, 5 mM KCl, 5 mM dextrose, and 5 mM alanine.)

HPLC VARIABLES

Column: 300 × 2 10 µm µBondapak C18

Mobile phase: MeOH:water 52:48

Flow rate: 0.13

Injection volume: 0.2

Detector: F ex 295 em 376 following post-column reaction. The column effluent mixed with 4 M NaOH pumped at 0.0013 mL/min and the mixture flowed through a 130 μ L PTFE coil at 64° to the detector.

CHROMATOGRAM

Internal standard: phenylbutazone

OTHER SUBSTANCES

Extracted: indomethacin

KEY WORDS

post-column reaction; microbore; phenylbutazone is IS

REFERENCE

De Zeeuw,D.; Leinfelder,J.L.; Brater,D.C. Highly sensitive measurement of indomethacin using a high performance liquid chromatographic technique combined with post column in-line hydrolysis, *J.Chromatogr.*, **1986**, *380*, 157–162.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a 500 μ g/mL solution in MeOH:water 50:50, inject a 5 μ L aliquot.

HPLC VARIABLES

Column: 250 \times 4.6 Zorbax C8

Mobile phase: Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L MeCN:water 20:80. A:B from 100:0 to 0:100 over 30 min. (Purify triethylamine as follows. Wash neutral alumina (Merck) 3 times with 2 bed volumes of pentane, 3 times with 2 bed volumes of dichloromethane, and 3 times with 2 bed volumes of MeOH, allow solvent to evaporate in a fume hood overnight, heat alumina at 130° for 2 h. Prepare a 14 cm column of the washed alumina in a 290 \times 22 tube, pass through a head volume of MeOH, pass through triethylamine. When triethylamine starts to elute discard the first 20 mL, use the next 20 mL, discard the column.)

Flow rate: 2

Injection volume: 5

Detector: UV 210

CHROMATOGRAM

Retention time: 26.7

OTHER SUBSTANCES

Simultaneous: acetophenone, amphetamine, desipramine, ethylmorphine, imipramine, mefenamic acid, methamphetamine, morphine, salicylic acid

KEY WORDS

also details of isocratic elution

REFERENCE

Hill,D.W. Evaluation of alkyl bonded silica and solvent phase modifiers for the efficient elution of basic drugs on HPLC, *J.Liq.Chromatogr.*, **1990**, *13*, 3147–3175.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 250 \times 4.6 Zorbax RX

Mobile phase: Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

Column temperature: 30

Flow rate: 2

Detector: UV 210

OTHER SUBSTANCES

Also analyzed: acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitrityline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fen-camfamine, fenoprofen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaacol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, imino-stilbene, imipramine, indomethacin, isocarbostyryl, isocarboxazid, isoniazid, isoproterenol, isox-suprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, meperidine, mephentermine, mephenytoin, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, meth-apyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyl-testosterone, methypylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nyldrin, oxazepam, oxycodone, oxy-morphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phencyclidine, phendi-metrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phenyl-eprhine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrila-mine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sufadiazine, sulfadimethoxine, sulfaethidole, sulfam-azazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulinda-c, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, the-obromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlylc-promine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleminamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

REFERENCE

Hill, D.W.; Kind, A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J. Anal. Toxicol.*, **1994**, *18*, 233-242.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a 50 µg/mL solution in the mobile phase, inject a 10 µL aliquot.

HPLC VARIABLES

Column: 250 × 4.6 7 µm Lichrosorb RP 18

Mobile phase: MeOH:water 50:50 containing 1% acetic acid

Flow rate: 1

Injection volume: 10

Detector: UV 254

CHROMATOGRAM**Retention time:** 15.57

OTHER SUBSTANCES**Simultaneous:** kebuzone, oxyphenbutazone, sulfinpyrazone

REFERENCE

Nivaud-Guernet,E.; Guernet,M.; Ivanovic,D.; Medenica,M. Effect of eluent pH on the ionic and molecular forms of the non-steroidal anti-inflammatory agents in reversed-phase high-performance liquid chromatography, *J.Liq.Chromatogr.*, **1994**, *17*, 2343–2357.

SAMPLE**Matrix:** solutions

HPLC VARIABLES**Column:** 150 × 3.9 Nova-Pak C18**Mobile phase:** MeCN:water 45:55, pH adjusted to 3.5 with acetic acid**Detector:** UV 280

OTHER SUBSTANCES**Also analyzed:** clomethacin, diclofenac, indomethacin

REFERENCE

Guterres,S.S.; Fessi,H.; Barratt,G.; Puisieux,F.; Devissaguet,J.-P. Poly(D,L-lactide) nanocapsules containing non-steroidal anti-inflammatory drugs: Gastrointestinal tolerance following intravenous and oral administration, *Pharm.Res.*, **1995**, *12*, 1545–1547.

SAMPLE**Matrix:** solutions

HPLC VARIABLES**Column:** 250 × 4.6 5 µm Supelcosil LC-DP (A) or 250 × 4.5 µm LiChrospher 100 RP-8 (B)**Mobile phase:** MeCN:0.025% phosphoric acid:buffer 25:10:5 (A) or 60:25:15 (B) (Buffer was 9 mL concentrated phosphoric acid and 10 mL triethylamine in 900 mL water, adjust pH to 3.4 with dilute phosphoric acid, make up to 1 L.)**Flow rate:** 0.6**Injection volume:** 25**Detector:** UV 229

CHROMATOGRAM**Retention time:** 10.15 (A), 12.11 (B)

OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetaminophen, acetazolamide, acetophenazine, albuterol, alprazolam, amitriptyline, amobarbital, amoxapine, antipyrine, atenolol, atropine, azatadine, baclofen, benzocaine, bromocriptine, brompheniramine, brotizolam, bupivacaine, buspirone, butabarbital, butalbital, caffeine, carbamazepine, cetirizine, chlorcyclizine, chlordi-azepoxide, chlormezanone, chloroquine, chlorpheniramine, chlorpromazine, chlorpropamide, chlorprothixene, chlorthalidone, chlorzoxazone, cimetidine, cisapride, clomipramine, clonazepam, clonidine, clozapine, cocaine, codeine, colchicine, cyclizine, cyclobenzaprine, dantrolene, desipramine, diazepam, diclofenac, diflunisal, diltiazem, diphenhydramine, diphenidol, diphenoxylate, dipyrindamole, disopyramide, dobutamine, doxapram, doxepin, droperidol, encainide, ethidium bromide, ethopropazine, fenoprofen, fentanyl, flavoxate, fluoxetine, fluphenazine, flurazepam, flurbiprofen, fluvoxamine, furosemide, glutethimide, glyburide, guaifenesin, haloperidol, homatropine, hydralazine, hydrochlorothiazide, hydrocodone, hydromorphone, hydroxy-chloroquine, hydroxyzine, ibuprofen, imipramine, indomethacin, ketoconazole, ketoprofen, ketorolac, labetalol, levorphanol, lidocaine, loratadine, lorazepam, lovastatin, loxapine, mazin-dol, mefenamic acid, meperidine, mephénytoin, mepivacaine, mesoridazine, metaproterenol, metformin, methadone, methdilazine, methocarbamol, methotrexate, methotrimeprazine, methoxamine, methyl dopa, methylphenidate, metoclopramide, metolazone, metoprolol, met-ronidazole, midazolam, moclobemide, morphine, nadolol, nalbuphine, naloxone, naphazoline,

naproxen, nifedipine, nizatidine, norepinephrine, nortriptyline, oxazepam, oxycodone, oxymetazoline, paroxetine, pemoline, pentazocine, pentobarbital, pentoxifylline, perphenazine, pheniramine, phenobarbital, phenol, phenolphthalein, phentolamine, phenyltoloxamine, phenytoin, pimizide, pindolol, piroxicam, pramoxine, prazepam, prazosin, probenecid, procainamide, procaine, prochlorperazine, procyclidine, promazine, promethazine, propafenone, propantheline, propiomazine, propofol, propranolol, protriptyline, quazepam, quinidine, quinine, racemethorphan, ranitidine, remoxipride, risperidone, salicylic acid, scopolamine, secobarbital, sertraline, sotalol, spironolactone, sulfinpyrazone, sulindac, temazepam, terbutaline, terfenadine, tetracaine, theophylline, thiethylperazine, thiopental, thioridazine, thiothixene, timolol, tocinide, tolbutamide, tolmetin, trazodone, triamterene, triazolam, trifluoperazine, triflupromazine, trimeprazine, trimethoprim, trimipramine, verapamil, warfarin, xylometazoline, yohimbine, zopiclone

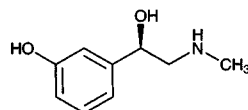
KEY WORDS

details of plasma extraction

REFERENCE

Koves,E.M. Use of high-performance liquid chromatography-diode array detection in forensic toxicology, *J.Chromatogr.A*, **1995**, 692, 103–119.

Phenylephrine



Molecular formula: $C_9H_{13}NO_2$

Molecular weight: 167.21

CAS Registry No.: 59-42-7, 61-76-7 (HCl)

Merck Index: 7440

Lednicer No.: 1 693

SAMPLE

Matrix: blood

Sample preparation: Condition a 1 mL Bond Elut phenyl SPE cartridge with 2 mL MeOH, 3 mL water, and 3 mL buffer. Add 1-2 mL plasma to the SPE cartridge, let it sit on the column for 2 min, wash with 2 mL buffer, wash with 1 mL water, elute with three 200 μ L aliquots of mobile phase, inject a 200 μ L aliquot of the eluate. (Buffer was prepared by mixing 50 mL 50 mM sodium bicarbonate and 5 mL 100 mM NaOH, make up to 100 mL with water, adjust pH to 9.6 with 10 mM NaOH (if necessary).)

HPLC VARIABLES

Column: 300 mm long 10 μ m μ Bondapak C18

Mobile phase: MeOH:1% acetic acid 10:90

Flow rate: 1

Injection volume: 200

Detector: F ex 270 em 305

CHROMATOGRAM

Retention time: 4.25

Limit of quantitation: 0.5 ng/mL

KEY WORDS

plasma; SPE; pharmacokinetics

REFERENCE

Chien,D.-S.; Schoenwald,R.D. Fluorometric determination of phenylephrine hydrochloride by liquid chromatography in human plasma, *J.Pharm.Sci.*, **1985**, 74, 562–564.

SAMPLE

Matrix: bulk

Sample preparation: Dissolve 5 mg amino acids in 10 mL MeCN:water:triethylamine 50:50:0.55. Remove a 50 μ L aliquot and add it to 50 μ L 0.66% 2,3,4,6-tetra-O-benzoyl- β -D-glucopyranosyl isothiocyanate (Fluka) in MeCN, shake mechanically for 30 min, add 10 μ L 0.26% ethanolamine in MeCN, shake for 10 min, make up to 1 mL with MeCN, inject a 10 μ L aliquot.

HPLC VARIABLES

Column: 25 \times 4 (sic) 5 μ m LiChrospher 100 RP-18

Mobile phase: MeOH:water 70:30

Flow rate: 1

Injection volume: 10

Detector: UV 231

CHROMATOGRAM

Retention time: k' 33.96, k' 40.07 (enantiomers)

OTHER SUBSTANCES

Simultaneous: epinephrine

KEY WORDS

derivatization; chiral

REFERENCE

Lobell, M.; Schneider, M.P. 2,3,4,6-Tetra-O-benzoyl- β -D-glucopyranosyl isothiocyanate: an efficient reagent for the determination of enantiomeric purities of amino acids, β -adrenergic blockers and alkyloxiranes by high-performance liquid chromatography using standard reversed-phase columns, *J. Chromatogr.*, **1993**, 633, 287–294.

SAMPLE

Matrix: formulations

Sample preparation: Capsules and Tablets. Leach 1 g of ground capsule or tablet with 250 mL 0.4 mg/mL 2,5-dihydroxybenzoic acid in water, sonicate for 10 min, centrifuge at 2500 rpm for 5 min, inject an aliquot. Liquid formulations. Dilute 4–25 mL of the formulation to 250 mL with 0.4 mg/mL 2,5-dihydroxybenzoic acid in water, inject an aliquot.

HPLC VARIABLES

Column: 250 \times 4.6 Partisil 10 C8

Mobile phase: MeOH:water:PIC-B5 300:675:25 (PIC-B5 (Waters) is 200 mM sodium pentane-sulfonate in glacial acetic acid.)

Flow rate: 2

Injection volume: 20

Detector: UV 254

CHROMATOGRAM

Retention time: 2.5

Internal standard: 2,5-dihydroxybenzoic acid (4.5)

OTHER SUBSTANCES

Simultaneous: phenylpropanolamine, guaifenesin, impurities, degradation products

KEY WORDS

capsules; tablets; liquid formulations; stability-indicating

REFERENCE

Schieffer, G.W.; Hughes, D.E. Simultaneous stability-indicating determination of phenylephrine hydrochloride, phenylpropanolamine hydrochloride, and guaifenesin in dosage forms by reversed-phase paired-ion high-performance liquid chromatography, *J. Pharm. Sci.*, **1983**, 72, 55–59.

SAMPLE

Matrix: formulations

Sample preparation: Leach 1-1.3 g ground capsule or tablet with water and dilute to 250 mL, sonicate for 5 min, centrifuge at 2500 rpm for 5 min, inject an aliquot. Dilute 4-25 mL of liquid formulations to 250 mL with water, inject an aliquot.

HPLC VARIABLES

Column: Partisil-10 C8

Mobile phase: MeOH:MeCN:water:PIC-B5 50:170:755:25 (PIC-B5 (Waters) is 200 mM sodium pentanesulfonate in glacial acetic acid.)

Flow rate: 2

Injection volume: 20

Detector: UV 254

CHROMATOGRAM

Retention time: 2.5

OTHER SUBSTANCES

Simultaneous: benzoic acid, phenylpropanolamine, guaifenesin, impurities, degradation products

KEY WORDS

tablets; capsules; liquid formulations; stability-indicating

REFERENCE

Schieffer, G.W.; Smith, W.O.; Lubey, G.S.; Newby, D.G. Determination of the structure of a synthetic impurity in guaifenesin: modification of a high-performance liquid chromatographic method for phenylephrine hydrochloride, phenylpropanolamine hydrochloride, guaifenesin, and sodium benzoate in dosage forms, *J.Pharm.Sci.*, **1984**, 73, 1856-1858.

SAMPLE

Matrix: formulations

Sample preparation: Dilute 3 mL nasal spray to 50 mL with MeOH:water 20:80, inject a 20 μ L aliquot.

HPLC VARIABLES

Column: 250 \times 4.6 10 μ m Partisil PXS 10/25

Mobile phase: MeOH:10.6 mM phosphoric acid 30:70 containing 50 mg/L sodium octanesulfonate

Flow rate: 1.5

Injection volume: 20

Detector: UV 210

CHROMATOGRAM

Retention time: 4

OTHER SUBSTANCES

Simultaneous: glutaric acid, benzyl alcohol (UV 254)

KEY WORDS

nasal sprays

REFERENCE

Wilson, T.D.; Forde, M.D.; Crain, A.V.R. Simultaneous liquid chromatographic determination of glutaric acid, phenylephrine, and benzyl alcohol in a prototype nasal spray with application to di- and tricarboxylic acids, *J.Pharm.Sci.*, **1985**, 74, 312-315.

SAMPLE

Matrix: formulations

Sample preparation: Tablets. Dissolve powdered tablets in 10 mM HCl, filter if necessary, inject an aliquot. Injections, solutions. Dilute with 10 mM HCl, inject an aliquot.

HPLC VARIABLES

Column: 250 \times 4.6 5 μ m Partisil-5 ODS-3

Mobile phase: MeOH:buffer 30:70 (Buffer was 10 mM sodium 1-octanesulfonate in 0.2% acetic acid.)

Flow rate: 1

Injection volume: 20

Detector: UV 220

CHROMATOGRAM

Retention time: 19

Limit of detection: 40 ng

OTHER SUBSTANCES

Simultaneous: norepinephrine, epinephrine, levonordefrin, isoproterenol, metaraminol, impurities

KEY WORDS

tablets; injections; ophthalmic solutions; inhalation solutions

REFERENCE

Smela, M.J., Jr.; Stromberg, R. Liquid chromatographic determination of six sympathomimetic drugs in dosage forms, *J. Assoc. Off. Anal. Chem.*, **1991**, 74, 289–291.

SAMPLE

Matrix: formulations

Sample preparation: Dilute syrup with mobile phase to a concentration of 5–100 µg/mL, shake, filter, inject an aliquot.

HPLC VARIABLES

Column: 250 × 4.6 5 µm 80 Å Ultrasphere CN

Mobile phase: MeCN:water:EtOH 60:38:2 containing 1 mM perchloric acid

Column temperature: 30

Flow rate: 1

Injection volume: 20

Detector: Conductivity, zero suppression 2, range 1 or 10

CHROMATOGRAM

Retention time: 8.0

OTHER SUBSTANCES

Simultaneous: bromhexine, chlorpheniramine, codeine, dextromethorphan, diphenhydramine, ephedrine, papaverine

KEY WORDS

syrup; indirect conductometric detection; presence of compound causes a decrease in mobile phase conductivity

REFERENCE

Lau, O.-W.; Mok, C.-S. High-performance liquid chromatographic determination of active ingredients in cough-cold syrups with indirect conductometric detection, *J. Chromatogr. A*, **1995**, 693, 45–54.

SAMPLE

Matrix: formulations

Sample preparation: Tablets. Grind tablets, weigh out a portion, dissolve in 50 mL mobile phase, sonicate, filter (No. 4 sintered glass plate), dilute, inject an aliquot. Capsules. Dissolve 10 capsules (without opening) in 100 mL mobile phase, sonicate, inject an aliquot. Injections, ampules, sprays. Dilute, inject an aliquot.

HPLC VARIABLES

Column: 120 × 4.6 Spherisorb C18 ODS-2

Mobile phase: Isopropanol:buffer 5:95 (Buffer was 100 mM sodium dodecyl sulfate containing 25 mM Na₂HPO₄, pH adjusted to 3.0 with HCl.)

Flow rate: 1
Injection volume: 20
Detector: UV 280

CHROMATOGRAM

Retention time: 7.5
Limit of detection: 7 ng/mL

OTHER SUBSTANCES

Simultaneous: carbidopa, dopamine, epinephrine, hydrochlorothiazide, isoproterenol, levodopa, methyldopa, norepinephrine

KEY WORDS

tablets; capsules; injections; ampules; sprays

REFERENCE

Villanueva Camaño, R.M.; Sanchis Mallols, J.M.; Torres Lapasió, J.R.; Ramis-Ramos, G. Analysis of pharmaceutical preparations containing catecholamines by micellar liquid chromatography with spectrophotometric detection, *Analyst*, **1995**, *120*, 1767–1772.

SAMPLE

Matrix: perfusate

Sample preparation: 30 μ L Perfusate (artificial CSF) + 10 μ L 200 mM perchloric acid. Mix a 25 μ L aliquot with 12.5 μ L reagent, let stand for 2 min, inject an aliquot. (Prepare a stock solution by dissolving 27 mg o-phthalaldehyde in 1 mL MeOH, add 5 μ L β -mercaptoethanol, add 9 mL 100 mM pH 9.3 sodium tetraborate containing 10 μ M EDTA. This solution is good for 5 days in a sealed amber bottle at room temperature. Prepare the working reagent by diluting 1 mL of the stock solution with 3 mL 100 mM pH 9.3 sodium tetraborate containing 10 μ M EDTA, allow to stand for 24 h before use.)

HPLC VARIABLES

Column: two columns 150 \times 4.6 5 μ m M.S. Gel C18 (ESA)

Mobile phase: MeOH:buffer 8:92 adjusted to pH 3.0 with phosphoric acid (Buffer was 54 mM NaH_2PO_4 containing 1.24 mM sodium heptanesulfonate.)

Column temperature: 33

Flow rate: 1.2

Detector: E, ESA Coulochem Electrode Array System Model 5500, detector temp 33°, oxidation potential 700 mV

CHROMATOGRAM

Retention time: 7.60

Limit of quantitation: 0.5 ng/mL

OTHER SUBSTANCES

Extracted: apomorphine, dopamine, hydralazine, isoproterenol, methoxamine, morphine, norepinephrine

KEY WORDS

rat; derivatization

REFERENCE

Acworth, I.N.; Yu, J.; Ryan, E.; Gariepy, K.C.; Gamache, P.; Hull, K.; Maher, T. Simultaneous measurement of monoamine, amino acid, and drug levels, using high performance liquid chromatography and coulometric array technology: application to in vivo microdialysis perfusate analysis, *J.Liq.Chromatogr.*, **1994**, *17*, 685–705.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH at a concentration of 1 mg/mL, inject a 20 μ L aliquot.

HPLC VARIABLES

Column: 250 \times 5 Spherisorb S5W

Mobile phase: MeOH:buffer 90:10 (Buffer was 94 mL 35% ammonia and 21.5 mL 70% nitric acid in 884 mL water, adjust the pH to 10.1 with ammonia.)

Flow rate: 2

Injection volume: 20

Detector: UV 254

CHROMATOGRAM

Retention time: 3.49

OTHER SUBSTANCES

Simultaneous: norpethidine, hydrocodone, dihydrocodeine, dihydromorphine, levorphanol, norcodeine, normorphine, pemoline, benzphetamine, diethylpropion, mazindol, tranlycypromine, caffeine, fenethyline, phendimetrazine, methylphenidate, phenelzine, epinephrine, pipradol, phenylpropanolamine, fencamfamin, chlorphentermine, norpseudoephedrine, fenfluramine, methylenedioxymphetamine, amphetamine, normetanephrine, 4-hydroxyamphetamine, bromo-STP, STP, prolintane, 2-phenethylamine, tyramine, methylephedrine, dimethylamphetamine, methamphetamine, mescaline, mephentermine, buprenorphine, dextromoramide, phenoperidine, fentanyl, etorphine, piritramide, noscapine, papaverine, naloxone, dextropropoxyphene, nalorphine, phenazocine, norpipanone, levallorphan, hydroxypethidine, normethadone, meperidine, dipipanone, diamorphine, pentazocine, acetylcodeine, monoacetylmorphine, thebacon, oxycodone, thebaine, norlevorphanol, methadone, benzylmorphine, ethylmorphine, morphine-N-oxide, codeine, codeine-N-oxide, morphine

Noninterfering: dopamine, levodopa, methyl dopa, methyl dopate, norepinephrine

Interfering: trimethoxyamphetamine, pseudoephedrine, ephedrine, ethoheptazine, morphine-3-glucuronide, pholcodeine

REFERENCE

Law,B.; Gill,R.; Moffat,A.C. High-performance liquid chromatography retention data for 84 basic drugs of forensic interest on a silica column using an aqueous methanol eluent, *J.Chromatogr.*, **1984**, *301*, 165-172.

SAMPLE

Matrix: solutions

Sample preparation: Prepare a 10 µg/mL solution in MeOH, inject a 20 µL aliquot.

HPLC VARIABLES

Column: 125 × 4.9 Spherisorb S5W silica

Mobile phase: MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7

Flow rate: 2

Injection volume: 20

Detector: E, LeCarbone, V25 glassy carbon electrode, + 1.2 V

CHROMATOGRAM

Retention time: 48

OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzocetamine, benzphetamine, benzquinamide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotenine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorprenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cyclizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipipranone, diprenorphine, dipyrizidamole, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, fluopromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserin, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamlamine, meclophenoxate, meclozine, medazepam, mephentermine, mepivacaine, meptazinol,

mepyramine, mesoridazine, metaraminol, methadone, methamphetamine, methapyrilene, methdilazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypromazine, methylephedrine, methylergonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nomifensine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, pecazine, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenylglutarimide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxybenzamine, phentolamine, phenyltoloxamine, physostigmine, pimindine, pimozone, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, properidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenyldiamine, theophylline, thiethylperazine, thiopropazate, thioproperazine, thioridazine, thiothixene, thonzylamine, timolol, tocainide, tolpropamine, tolycaine, tranlycypromine, trazodone, trifluoperazine, trifluoperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripeleminamine, triprolidine, tryptamine, verapamil, xylometazoline

REFERENCE

Jane, I.; McKinnon, A.; Flanagan, R. J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J. Chromatogr.*, **1985**, 323, 191–225.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH:water 1:1 at a concentration of 50 µg/mL, inject a 10 µL aliquot.

HPLC VARIABLES

Column: 300 × 3.9 10 µm µBondapak C18

Mobile phase: Acetic acid:triethylamine:water 1.5:0.5:98

Flow rate: 1.5

Injection volume: 10

Detector: UV

CHROMATOGRAM

Retention time: k' 0.38

REFERENCE

Roos, R. W.; Lau-Cam, C. A. General reversed-phase high-performance liquid chromatographic method for the separation of drugs using triethylamine as a competing base, *J. Chromatogr.*, **1986**, 370, 403–418.

SAMPLE

Matrix: solutions

Sample preparation: Make up a solution in 40 mM sodium formate and 62 mM formic acid buffer (pH 3.5), inject a 20 µL aliquot.

HPLC VARIABLES

Guard column: 10 µm CN (Waters)

Column: 150 × 4.6 5 µm Ultrasphere CN

Mobile phase: MeOH:buffer 15:85 (Buffer was 40 mM sodium formate and 62 mM formic acid, pH 3.5.)

Flow rate: 1

Injection volume: 20

Detector: UV 258

CHROMATOGRAM

Retention time: 2.7

OTHER SUBSTANCES

Simultaneous: hydralazine, phthalazine

REFERENCE

Halasi,S.; Nairn,J.G. Quantitative determination of hydralazine hydrochloride and phthalazine in aqueous solutions by high performance liquid chromatography, *J.Liq.Chromatogr.*, **1989**, *12*, 2397–2403.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 250 × 4.6 5 µm Partisil ODS-3

Mobile phase: MeOH:buffer 30:70 (Buffer was 10 mM octanesulfonic acid in 0.2% acetic acid.)

Flow rate: 1

Detector: UV 220

CHROMATOGRAM

Retention time: 19

OTHER SUBSTANCES

Simultaneous: epinephrine, isoproterenol, levonordefrin, metaraminol

REFERENCE

Phenomenex Catalog, **1994**, p. 1.077.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 250 × 4.6 Zorbax RX

Mobile phase: Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

Column temperature: 30

Flow rate: 2

Detector: UV 210

OTHER SUBSTANCES

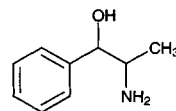
Also analyzed: acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitriptyline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fencamfamine, fenpropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiacol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminosilbene, imipramine, indomethacin, isocarboxtyril, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, meperidine, mephentermine, mephenytoin, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methyprylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone,

naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nylidrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phencyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phentermine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyridylidone, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfaethidole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleminamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

REFERENCE

Hill, D.W.; Kind, A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J. Anal. Toxicol.*, **1994**, *18*, 233-242.

Phenylpropanolamine



Molecular formula: C₉H₁₃NO

Molecular weight: 151.21

CAS Registry No.: 14838-15-4, 154-41-6 (HCl)

Merck Index: 7461

SAMPLE

Matrix: blood, urine

Sample preparation: Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50 µL MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject a 10 (urine) or 30 (blood) µL aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

HPLC VARIABLES

Guard column: 20 mm long Symmetry C18

Column: 250 × 4.6 5 µm Symmetry C8 (Waters)

Mobile phase: Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.

Column temperature: 30

Flow rate: 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)

Injection volume: 10-30

Detector: UV 205.2

CHROMATOGRAM

Retention time: 5.015

KEY WORDS

whole blood

REFERENCE

Gaillard, Y.; Pépin, G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J. Chromatogr. A*, **1997**, 763, 149–163.

SAMPLE

Matrix: solutions

Sample preparation: Inject an aliquot of a 100 µg/mL solution in mobile phase.

HPLC VARIABLES

Column: 150 × 4.5 µm Crownpak CR(+) immobilized crown ether

Mobile phase: MeOH:0.1% pH 1.9 perchloric acid 15:85

Column temperature: 40

Flow rate: 1

Detector: UV 210

CHROMATOGRAM

Retention time: 2.95, 3.38

OTHER SUBSTANCES

Simultaneous: baclofen, levodopa, primaquine

KEY WORDS

chiral; comparison with capillary electrophoresis

REFERENCE

Nishi, H.; Nakamura, K.; Nakai, H.; Sato, T. Separation of enantiomers and isomers of amino compounds by capillary electrophoresis and high-performance liquid chromatography utilizing crown ethers, *J. Chromatogr. A*, **1997**, 757, 225–235.

Phenyltoloxamine

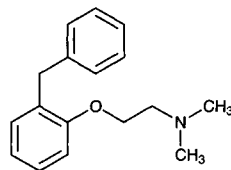
Molecular formula: C₁₇H₂₁NO

Molecular weight: 255.36

CAS Registry No.: 92-12-6, 1176-08-5 (citrate)

Merck Index: 7469

Lednicer No.: 1 115



SAMPLE

Matrix: blood

Sample preparation: 1 mL Plasma + 200 µL ammonia, extract twice with 7 mL pentane:diethyl ether 75:25. Combine the organic layers and evaporate them to dryness, reconstitute the residue in 150 µL mobile phase, inject a 90 µL aliquot.

HPLC VARIABLES

Column: 150 × 4.6 3 µm Spherisorb CN cyanopropyl

Mobile phase: MeCN:5 mM pH 6 phosphate buffer 40:60

Flow rate: 1

Injection volume: 90

Detector: E, Environmental Science Associates Coulochem model 5010, screen mode +0.55 V and +0.90 V

CHROMATOGRAM

Retention time: 19

Internal standard: phenyltoloxamine

OTHER SUBSTANCES**Extracted:** carbinoxamine**KEY WORDS**

plasma; phenyltoloxamine is IS

REFERENCE

Stockis,A.; Deroubaix,X.; Jeanbaptiste,B.; Lins,R.; Allemon,A.M.; Laufen,H. Relative bioavailability of carbinoxamine and phenylephrine from a retard capsule after single and repeated dose administration in healthy subjects, *Arzneimittelforschung*, **1995**, *45*, 1009–1012.

SAMPLE**Matrix:** solutions**Sample preparation:** Prepare a 10 µg/mL solution in MeOH, inject a 20 µL aliquot.**HPLC VARIABLES****Column:** 125 × 4.9 Spherisorb S5W silica**Mobile phase:** MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7**Flow rate:** 2**Injection volume:** 20**Detector:** E, LeCarbone, V25 glassy carbon electrode, + 1.2 V**CHROMATOGRAM****Retention time:** 3.8**OTHER SUBSTANCES**

Also analyzed: acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzocetamine, benzphetamine, benzquinamide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotenine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorprenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cyclizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazepine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipipanone, diprenorphine, dipyrindamole, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, flupromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserine, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamlamine, meclophenoxate, meclozine, medazepam, mephentermine, mepivacaine, meptazinol, mepyramine, mesoridazine, metaraminol, methadone, methamphetamine, methapyrilene, methdilazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypropazine, methylephedrine, methylegonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, naltrexone, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nomifensine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, pecazine, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenglutaramide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxybenzamine, phentolamine, phenylephrine, physostigmine, pimindodine, pimozone, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, properidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenylidamine, theophylline, thiethylperazine, thiopropazate, thiopropazine, thioridazine, thiothixene, thonzylamine, timolol, tocanide, tolpropamine, tolycaine, tranlycypromine, trazodone, trifluoperazine, trifluoperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripelennamine, triprolidine, tryptamine, verapamil, xylometazoline

REFERENCE

Jane, I.; McKinnon, A.; Flanagan, R.J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J.Chromatogr.*, **1985**, 323, 191–225.

SAMPLE

Matrix: solutions

Sample preparation: Dissolve in MeOH:water 1:1 at a concentration of 50 µg/mL, inject a 10 µL aliquot.

HPLC VARIABLES

Column: 300 × 3.9 10 µm µBondapak C18

Mobile phase: MeOH:acetic acid:triethylamine:water 50:1.5:0.5:48

Flow rate: 1.5

Injection volume: 10

Detector: UV 254

CHROMATOGRAM

Retention time: 12

OTHER SUBSTANCES

Simultaneous: thonzylamine, pheniramine, tripeleennamine, chlorpheniramine, brompheniramine, phenindamine, clemizole

REFERENCE

Roos, R.W.; Lau-Cam, C.A. General reversed-phase high-performance liquid chromatographic method for the separation of drugs using triethylamine as a competing base, *J.Chromatogr.*, **1986**, 370, 403–418.

SAMPLE

Matrix: solutions

HPLC VARIABLES

Column: 250 × 4.6 5 µm Supelcosil LC-DP (A) or 250 × 4.5 µm LiChrospher 100 RP-8 (B)

Mobile phase: MeCN:0.025% phosphoric acid:buffer 25:10:5 (A) or 60:25:15 (B) (Buffer was 9 mL concentrated phosphoric acid and 10 mL triethylamine in 900 mL water, adjust pH to 3.4 with dilute phosphoric acid, make up to 1 L.)

Flow rate: 0.6

Injection volume: 25

Detector: UV 229

CHROMATOGRAM

Retention time: 13.20 (A), 6.31 (B)

OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetaminophen, acetazolamide, acetophenazine, albuterol, alprazolam, amitriptyline, amobarbital, amoxapine, antipyrine, atenolol, atropine, azatadine, baclofen, benzocaine, bromocriptine, brompheniramine, brotizolam, bupivacaine, buspirone, butabarbital, butalbital, caffeine, carbamazepine, cetirizine, chlorcyclizine, chlordi-azepoxide, chlormezanone, chloroquine, chlorpheniramine, chlorpromazine, chlorpropamide, chlorprothixene, chlorthalidone, chlorzoxazone, cimetidine, cisapride, clomipramine, clonazepam, clonidine, clozapine, cocaine, codeine, colchicine, cyclizine, cyclobenzaprine, dantrolene, desipramine, diazepam, diclofenac, diflunisal, diltiazem, diphenhydramine, diphenidol, diphenoxylate, dipyrindamole, disopyramide, dobutamine, doxapram, doxepin, droperidol, encainide, ethidium bromide, ethopropazine, fenoprofen, fentanyl, flavoxate, fluoxetine, fluphenazine, flurazepam, flurbiprofen, fluvoxamine, furosemide, glutethimide, glyburide, guaifenesin, haloperidol, homatropine, hydralazine, hydrochlorothiazide, hydrocodone, hydromorphone, hydroxy-chloroquine, hydroxyzine, ibuprofen, imipramine, indomethacin, ketoconazole, ketoprofen, ketorolac, labetalol, levorphanol, lidocaine, loratadine, lorazepam, lovastatin, loxapine, mazin-dol, mefenamic acid, meperidine, mephénytoin, mepivacaine, mesoridazine, metaproterenol, metformin, methadone, methdilazine, methocarbamol, methotrexate, methotrimeprazine, methoxamine, methyl dopa, methylphenidate, metoclopramide, metolazone, metoprolol, met-

ronidazole, midazolam, moclobemide, morphine, nadolol, nalbuphine, naloxone, naphazoline, naproxen, nifedipine, nizatidine, norepinephrine, nortriptyline, oxazepam, oxycodone, oxymetazoline, paroxetine, pemoline, pentazocine, pentobarbital, pentoxifylline, perphenazine, pheniramine, phenobarbital, phenol, phenolphthalein, phentolamine, phenylbutazone, phenytoin, pimozide, pindolol, piroxicam, pramoxine, prazepam, prazosin, probenecid, procainamide, procaine, prochlorperazine, procyclidine, promazine, promethazine, propafenone, propantheline, propiomazine, propofol, propranolol, protriptyline, quazepam, quinidine, quinine, racemethorphan, ranitidine, remoxipride, risperidone, salicylic acid, scopolamine, secobarbital, sertraline, sotalol, spirinolactone, sulfapyrazone, sulindac, temazepam, terbutaline, terfenadine, tetracaine, theophylline, thiethylperazine, thiopental, thioridazine, thiothixene, timolol, tocainide, tolbutamide, tolmetin, trazodone, triamterene, triazolam, trifluoperazine, triflupromazine, trimetoprim, trimethoprim, trimipramine, verapamil, warfarin, xylometazoline, yohimbine, zopiclone

KEY WORDS

details of plasma extraction

REFERENCE

Koves, E.M. Use of high-performance liquid chromatography-diode array detection in forensic toxicology, *J.Chromatogr.A*, **1995**, 692, 103–119.

Phenytoin

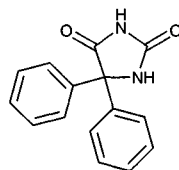
Molecular formula: C₁₅H₁₂N₂O₂

Molecular weight: 252.27

CAS Registry No.: 57-41-0, 630-93-3 (sodium salt)

Merck Index: 7475

Lednicer No.: 1 246



SAMPLE

Matrix: blood

Sample preparation: 200 µL Serum + 100 µL 30 mg/L IS in water + 200 µL 25% saturated ammonium acetate, mix. Add the sample to the reservoir of a primed 4 mm/1 mL Empore C8 SPE disk cartridge suspended in a test tube (16 × 100 mm). Force the liquid then 500 µL water through the disk by centrifuging at 100-120 g for 5 min. Suspend disk cartridge in a tube, elute the drug with 100 µL MeCN and 300 µL water. Combine the eluates, inject a 50 µL aliquot.

HPLC VARIABLES

Guard column: 20 × 2 30 µm Permaphase ETH (DuPont)

Column: 250 × 4.6 Zorbax Stable-Bond CN

Mobile phase: MeCN:MeOH:acetic acid:triethylamine: water 15:12.5:0.1:0.06:72.5 (Connect a 250 × 4.6 column dry packed with 37-53 µm silica gel (Whatman) as a mobile-phase saturating column between the pump and the injector.)

Column temperature: 50

Flow rate: 1.2

Injection volume: 50

Detector: UV 214

CHROMATOGRAM

Retention time: 10.5

Internal standard: cyheptamide (14)

Limit of detection: 20-35 ng/mL

OTHER SUBSTANCES

Extracted: carbamazepine, carbamazepine diol, carbamazepine epoxide, lamotrigine, 5-(p-hydroxyphenyl)-5-phenylhydantoin